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Earnings Dynamics in Canada: The Correlation of Individuals' Earnings Over Time, 1982-1992

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By
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Abstract

While we already know a good deal about the distribution of earnings of Canadians in any given year and how the situation has changed over the last couple of decades, our understanding of earnings dynamics - how individuals' earnings vary from one year to the next or over longer periods of time - has remained quite limited. The recent availability of the Longitudinal Administrative Databank has, however, facilitated the development of an extensive research agenda focused on earnings dynamics which will help fill some of the important gaps in our understanding in this area. The following five research papers by Ross Finnie are part of the first phase of this research agenda, presenting a series of findings on individuals' earnings dynamics between 1982 and 1992 or 1993.

- The Earnings Mobility of Canadians, 1982 – 1992
- The Distribution of Earnings in a Dynamic Context, 1982-1992
- The Correlation of Individuals' Earnings Over Time, 1982 – 1992
- Earnings Patterns by Age and Sex in Canada, 1982 – 1992
- A Dynamic Analysis of Low Market Incomes (Market Poverty) of Canadian Families with Children, 1992 - 1993

This paper examines h[illegible] individuals' earnings mobility varies with the length of the interval considered, the specific time period covered, the starting point in the earnings distribution, and age and sex. The three types of instruments used in this paper include correlation coefficients (*i.e.*, the correlation of individuals' earnings over time), the average quintile jump, and the mean quintile index (also used in "The Earnings Mobility of Canadians, 1982-1992"). Results for the first two measures are placed in an international context. The findings indicate that there tends to be greater mobility across longer periods of time, but at a decreasing marginal rate, while there is generally greater mobility amongst younger workers and women relative to older workers and men. The extent of mobility also varies with the starting quintile position, with more mobility in the lower quintiles and more stability at the top. The paper also shows that Canadian men tend to have slightly greater earnings mobility than do men in other Organisation for Economic Cooperation and Development (OECD) countries, while Canadian women tend to have mobility rates similar to other women. Finally, there have been some important shifts in mobility patterns over time, with an overall decline in upward mobility and commensurately greater stability at lower earnings levels. These trends vary significantly by age and sex, however, with the changes favouring women over men, and the situation of younger workers deteriorating relative to older ones.

Résumé

Nous connaissons déjà fort bien la répartition de la rémunération dans la population canadienne pour une année donnée et l'évolution de la situation à cet égard au cours des deux dernières décennies, mais notre compréhension de la dynamique de la rémunération – comment la rémunération individuelle varie d'une année à l'autre ou sur une période plus longue – demeure très limitée. Toutefois, l'accès récent à la Base de données administratives longitudinales a permis l'élaboration d'un vaste projet de recherche sur la dynamique de la rémunération, qui nous aidera à combler les importantes lacunes de notre compréhension en ce domaine. Les cinq rapports de recherche suivants font partie du premier volet de ce projet de recherche et renferment une série de constatations sur la dynamique de la rémunération des individus entre 1982 et 1992 ou 1993.

- La mobilité de la rémunération des canadiens, 1982 – 1992
- Répartition de la rémunération dans le contexte dynamique, 1982 – 1992
- The Correlation of Individuals' Earnings Over Time, 1982 – 1992
- Earnings Patterns by Age and Sex in Canada, 1982 – 1992
- Analyse dynamique des faibles revenus marchands (pauvreté selon le revenu marchand) des familles canadiennes ayant des enfants, 1992 – 1993

Le document examine la mobilité de la rémunération individuelle en fonction de l'intervalle étudié, de la période de temps visée, du point de départ considéré dans la répartition de la rémunération ainsi que de l'âge et du sexe. Trois types d'instruments ont été utilisés dans cette étude : les coefficients de corrélation (la corrélation entre les rémunérations des individus sur une période de temps), l'écart moyen de quintile et l'indice moyen de quintile (également utilisé dans le premier rapport de recherche de la série « *La mobilité de la rémunération des canadiens* »). Les résultats obtenus à l'aide des deux premiers instruments sont situés dans un contexte international. On constate une tendance à une plus grande mobilité sur des périodes plus longues, mais à un taux marginal décroissant, tandis qu'il y a une plus grande mobilité chez les jeunes travailleurs et les femmes en comparaison des travailleurs plus âgés et des hommes. Le degré de mobilité dépend également du quintile occupé au départ, et il est plus marqué dans les quintiles inférieurs et plus stable en haut de l'échelle. Le document montre aussi que chez les hommes, la mobilité de la rémunération est légèrement plus marquée au Canada que dans les autres pays de l'Organisation de Coopération et de Développement Économiques (OCDE), tandis que les Canadiennes ont des taux de mobilité semblables à ceux des femmes des autres pays de l'OCDE. Finalement, les tendances concernant la mobilité ont changé considérablement au fil des ans, avec une diminution généralisée de la mobilité ascendante et, en conséquence, une plus grande stabilité aux niveaux inférieurs de rémunération. Cependant, ces tendances varient largement en fonction de l'âge et du sexe, les femmes étant favorisées par rapport aux hommes, et la situation des jeunes travailleurs se détériorant en comparaison de celle des travailleurs plus âgés.

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1. Introduction

We now know a good deal about the distribution of earnings in any given year and how the situation has changed over the last couple of decades in Canada. One important element of this understanding is that there appears to have been a significant increase in earnings inequality, thus raising various concerns and generating increased interest in issues relating to the distribution of earnings in general.

In contrast, we know virtually nothing about earnings *mobility*, that is, how earnings change from one year to another for given individuals. We do not know, for example, if the increasing inequality observed on a cross-sectional basis has been offset by increased mobility which may even have produced *lower* inequality when viewed in a longer-term perspective, with such a longer view probably the better indicator of economic well-being. Furthermore, Canada increasingly stands out in this current state of ignorance. For example, the Canadian record is effectively excluded from recent and forthcoming OECD reports on earnings mobility (OECD [1996, 1997]) due to the non-existence of any general studies on the subject.

This dearth of understanding regarding earnings mobility is especially important in a policy context. Innumerable issues relating to economic security, economic opportunity, and labour market performance are either directly or indirectly related to earnings dynamics, including both short-term earnings volatility and longer-term movements up and down the earnings ladder.[1]

If understanding earnings mobility is so important, why do we know so little? The reason is that virtually all existing Canadian studies of earnings patterns are based on cross-sectional data gathered at a single point in time, whereas the study of earnings mobility requires longitudinal data which follow the same individuals over time. Alas, until recently, Canada has had no longitudinal databases of the size, length, or representative nature needed to undertake a general study of earnings dynamics.[2]

It is into this gap that the present study steps, reporting the results of an empirical analysis of the earnings mobility of Canadians from 1982 to 1992 based on the Longitudinal Administrative Databank (LAD). LAD is a relatively new Statistics Canada database which

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[1] See Atkinson *et al* [1992] and OECD [1996] for general discussions of the policy relevance of earnings mobility and Beach and Slotsve [1995] and various articles in Banting and Beach [1995] for a Canadian perspective.

[2] The data coming closest to these characteristics are the Labour Market Activity Surveys of the mid- and late-1980's. These were, however, very "short" panels, following individuals for just two and three years respectively and were thus inappropriate for addressing most interesting questions regarding the distribution of earnings in a dynamic context. Using an alternative strategy, Beach and Slotsve [1996] attempt to simulate earnings dynamics from series of cross-sections using Survey of Consumer Finance data. However, in the end, no matter how sophisticated the statistical method and how good the cross-sectional data, the results of any such "pseudo-dynamic" analysis remain hypothetical, general, and severely limited in terms of any practical policy-relevant application.

has the size, representative sample framework, longitudinal structure, and earnings information required to carry out such a study. The paper addresses the following broad questions:

- What is the overall extent of earnings mobility in Canada?
- How do mobility patterns compare across sex-age groups?
- How does short-term mobility compare with longer-term mobility?
- How does earnings mobility vary over the business cycle?
- Did the structure of earnings mobility change from the early 1980's into the early 1990's?

These questions are addressed using two sets of measures. First, correlation coefficients representing the relationship of individuals' earnings from one year to another are presented across various numbers of years and over different periods of time. Second, relative movements across the earnings distribution are examined by looking at inter-quintile mobility in two ways: by using the "average jump" measure which is common in the earnings mobility literature (*i.e.*, the mean number of quintiles moved from one year to another); and by tracking the "mean quintile index" which represents the average quintile ranking of a given group of workers in the overall distribution of earnings over time, thus adding a directional element to the movements which is lacking in the correlation coefficient and average jump measures.[3] Mobility patterns are looked at for all workers taken together, for all men and all women, and by eight specific sex-age groups.

In the next section, the existing literature on earnings mobility is reviewed. This is followed by a discussion of the data and the methodology employed, then the empirical findings. The paper has a short concluding section which summarizes the main findings and puts them in a broader context.

[3] Other papers by the author use alternative approaches to studying earnings dynamics. Finnie [1997b] looks at transition matrices across real earnings levels and the calculation of summary inequality measures (the Gini coefficient, mean squared deviations, and Theil indices) using earnings averaged over different numbers of years, while Finnie [1997c] focuses on quintile transition matrices.

2. The Literature

The major findings of the recent work on the distribution of earnings in Canada include that there has been a general increase in earnings inequality, probably beginning as far back as the early- or mid-1970s but most concentrated in the early 1980s recession; that the distribution of earnings has widened within virtually all sex-age groups, but especially amongst men, and less so (and in some cases reversed) amongst women when part-time/part-year female workers are included; that women's wages have generally risen relative to men's; and that the earnings of younger workers -- both male and female – have fallen relative to older workers.[4]

The underlying causes of the observed changes include demand-side factors such as globalization and technical change, which are thought to have shifted earnings patterns according to the effects of import competition and the relative scarcity of skills relating to technology. Supply side factors are also considered to be important, including the large size of the baby boom generation and its high education levels putting downward pressure on their earnings as a cohort and cutting into the education premium in the 1970s, the more recent declines in the earnings of younger workers perhaps being attenuated by their relatively small numbers, and various effects related to the greater labour force attachment of women. Institutional factors have almost certainly also played a role with, for example, institutional arrangements (*e.g.*, hiring and firing rules, two-tier contracts) concentrating the effects of the demand and supply factors on more vulnerable groups of workers, such as the young and less skilled.[5]

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[4] See, for example, Beach and Slotsve [1996], Morissette, Myles and Picot [1995], Riddell [1995], and Zyblock [1996]. See Levy and Murnane [1992] for a review of the literature focused on the U.S. situation and Atkinson, Rainwater, and Smeeding [1995], Gottschalk and Smeeding [1996], and OECD [1993, 1996] for cross-national perspectives. See also various articles in Card and Freeman [1993] for comparisons of the Canadian situation with the U.S. and Card, Kramarz and Lemieux [1986] for a comparative analysis of Canada, the U.S. and France.

[5] For further discussion of the causes of the observed shifts in the distribution of earnings in addition to the previously referenced work which describes and analyses recent trends in the distribution of earnings for Canada (especially Beach and Slotsve [1996] and Riddell [1995]), the U.S. (Levy and Murnane [1992]) and other countries (Atkinson *et al* [1995], Gottschalk and Smeeding [1996])), also Beach [1995], Betcherman [1995], Blau and Kahn [1996], Danziger and Gottschalk [1995], various articles in Danziger and Gottschalk [1993], DiNardo, Fortin and Lemieux [1995], Freeman and Katz [1995], Juhn, Murphy and Pierce [1993], Katz and Murphy [1992], and Murphy and Welch [1992, 1993].

Regarding earnings mobility, apart from two quite specific Canadian pieces of rather limited relevance to this paper, there is only the international literature to which we can turn.[6] Atkinson *et al* [1992] and OECD [1996] provide excellent general treatments of the topic in terms of identifying the basic issues and their policy relevance, placing the relevant questions in a theoretical perspective, evaluating the various approaches used to analyse earnings mobility, identifying various key data issues, and reviewing the existing international empirical evidence.[7]

It is difficult, however, to compare results across countries, due to differences in the basic types of database (survey versus administrative), in other data characteristics (coverage, attrition, the earnings variable available), in the methods employed (formal models versus various more intuitive measures), the particular populations studied (varying by age, sex, and other socio-demographic characteristics, as well as labour force status), the specific interval of time analysed (ranging from mobility from one year to the next to one French study which followed individuals a full thirty-six years), the particular period covered (some

[6] Morissette and Bérubé [1996] focus on two specific issues: i) the incidence, characteristics, and duration of low earnings spells, and ii) comparisons of inequality measures when using earnings averaged over longer periods of time versus annual measures. Their empirical analysis covers the period 1975-94 and is restricted to men. Employing a variety of methods – cross-tabulations of earnings levels and spell duration, hazard models of the rate of leaving low earnings, regression models of earnings levels, and the calculation of a number of inequality measures over two different time periods – they find that short-term downward mobility from higher earnings levels does not seem to have increased, that there was an increase in the number of workers coming into the earnings distribution at low earnings levels, that the probability of moving up from low earnings levels to higher ones declined slightly over time, and there was a smaller reduction in the probability of moving down (out of the sample) from low earnings levels over time. Furthermore, the evidence suggests that longer-term earnings inequality increased as much as the inequality of annual earnings from the earlier years to the later ones.

The other Canadian piece, Kennedy [1989], tests the Gibrat "law of proportional effect" which asserts that random changes in personal income are likely to be proportional to the level of income, implying independence between earnings level and earnings variation net of scale effects. Kennedy estimates an earnings model for each individual and studies the variability in earnings around the resulting individual-based means using time-series methods with a very specific sample of men born in 1930 and continuously employed 1966 through 1983 taken from Canada Pension Plan administrative files. The primary result is that these men tended to experience similar earnings fluctuations in percentage terms – thus affirming Gibrat's conjecture. Furthermore, these workers had greater variations in earnings while young, whereas middle age brought on a period where most cross-sectional differences in earnings represented "permanent" rather than transitory change.

[7] Bourguignon *et al* present a broader and more complete view of the various theoretical and data issues. Their review of the existing evidence is similarly more extensive, covering a greater number of more diverse studies which vary according to the country studied, the interval of time considered, the specific periods of time covered, the particular groups of workers studied, and the methods employed. The OECD report is, in contrast, more focused on a particular group of countries (Denmark, Finland, France, Germany, Italy, Sweden, the United Kingdom, and the United States), is mostly limited to full-time workers only, concentrates on a common set of "intuitive" mobility measures (including correlation coefficients and transition matrices), and focuses on a specific set of years and intervals of comparison (from the mid-1980s to the early-1990s, looking at mobility from one to five years apart).

studies are quite dated, others more recent, with the point in the economic cycle traversed being a key consideration in any comparisons), and other specific factors.[8]

Despite these limitations, there are a number of general findings regarding earnings mobility which can be identified. These include that earnings mobility is greater when measured over longer periods of time, but never converges towards a situation representing "complete mobility"; that mobility is generally greater amongst younger workers than older ones and when part-time, part-year workers are included along with full-time, full-year workers; and that women are generally less likely to stay at the top of the earnings distribution and more likely to remain at the bottom than men (while recognizing the need for more research on women's earnings dynamics in general). Moreover, mobility patterns appear to vary considerably from one nation to another, suggesting that country-specific factors such as the structure of labour markets, the social setting, labour market and social institutions, are important determinants of the situation in any particular country. Furthermore, there appears to be no clear general trend towards more or less mobility over time. [9]

From a methodological standpoint, Atkinson *et al* and the OECD studies conclude that research based on the administrative data of the type used here is generally characterized by better coverage, less attrition, and more reliable measures of earnings. They also point out, however, that administrative data typically lack the sorts of variables which make for more detailed, more analytical studies (*e.g.*, education, occupation, work experience).

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[8] Furthermore, most of these comparability problems are virtually unresolvable because even if databases could be rendered comparable on a current basis, it is quite another matter to obtain such compatibility for years past. This would be necessary for a "new" database to be used in a study of earnings dynamics (that is, apart from waiting for new years of data to accumulate).

[9] This summary is largely based on the results reported in Bourguignon *et al* [1992] and OECD [1996], but also includes various other specific studies, including Datcher-Loury [1986], Duncan, Smeeding and Rodgers [1994], Gittleman, and Joyce [1995], Gottschalk [1982], Gottschalk and Moffitt [1994], Hungerford [1993], Kennedy [1989], Sawhill and Condon [1992], Schiller [1977, 1994], Smith [1994], and Veum [1992]. Some of the articles above deal with families and broader measures of income as opposed to the focus on individuals' earnings of this paper.

3. The Data and the Working Samples

3.1 The Principal Characteristics of the LAD File

The Longitudinal Administrative Databank (LAD) represents a ten percent longitudinal sample of Canadian tax-filers constructed from Revenue Canada tax files. The basic unit of observation is the individual – the unit of analysis of this study – but one key characteristic of the LAD is that family-based information is attached to individuals' records. This is used to match individuals into households on the basis of the information contained in their tax files. The first year of data for the LAD is 1982 and the file was originally constructed to run through 1992, thus determining the period covered by this analysis. The work reported below is based on a one percent version of the LAD which has since been supplanted by the current ten percent format.

The first step in the construction of the LAD involves the selection of individuals into an underlying tax-filer database according to a random number generator based on Social Insurance Numbers (SINs).[10] If an individual is selected into the file in any given year, that individual will also be selected in all other years he or she files taxes.[11] The LAD is then constructed by matching individuals over time via their SINs.[12] Individuals drop out of the LAD if they become non-filers, while new filers are continually added to the database in the fixed one-in-ten ratio.[13] The size of the file has grown over time reflecting the growth in the underlying tax-filing population. The LAD thus represents a dynamic ten percent longitudinal sample of Canadian tax filers.

The LAD's coverage of the adult population is very good since, unlike some other countries (such as the U.S.), the rate of tax filing is very high. Higher income Canadians are required by law to do so, while lower income individuals have incentives to file in order to recover

[10] This underlying file is called the T1FF ("T-1 Family File"). T1FF files are a series of annual (cross-sectional) files constructed by Statistics Canada by matching Revenue Canada taxfiler records on individuals into family units based on direct declarations and other related information contained in individuals' tax files (especially deductions), as well as address matches in the case of common-law couples before 1992. See the author for further information on this matching process and the characteristics of the resulting files.

[11] Records are also created for individuals in years in which they do not file tax forms if they are identified by a filing spouse. Such imputed records are not, however, included in this analysis, primarily because their inclusion would lead to biased sampling in terms of marital status and income. More specifically, a low-income married individual would be more likely to appear in the sample than a low-income non-married individual, since the former could be imputed while the latter could not be.

[12] Special procedures are used to deal with individuals who change their SINs, who have multiple SINs, and other non-standard cases. Such cases comprise on the order of 4 percent of the file in any given year, and correct handling of these records becomes particularly important in a longitudinal context, especially in order to minimize length-biased sampling. The T-4 based tax records used by Morissette and Berube do not incorporate such adjustments.

[13] The principal reasons for not filing are having a low income and therefore not being required to file while deciding to forego the tax credits and other benefits available to low-income filers (see next paragraph), being out of the country, and death.

income tax and other payroll tax deductions made through the year and, since 1986, to benefit from sales tax credits. The full set of tax files from which the LAD is constructed is estimated to cover from .91 to .95 percent of the target population (official population estimates based on the census with annual updates). Such thorough coverage is especially important to any analysis of earnings dynamics, since any significant attrition from the sample over time could lead to serious bias. Evidence indicating that the LAD is a good performer in this regard is presented below.[14]

In general, the LAD includes information based on individuals' tax files: basic demographic characteristics, income (sources, amounts), deductions, and taxes.[15] Most critical to this analysis is the excellent quality of the income information, with the earnings variable (wage and salary income) forming the backbone of the study and constituting an appropriate and consistent measure over the full period covered by the database.

The eleven years spanned by the LAD-derived files facilitate the analysis of earnings dynamics in a number of different time frames: shorter-term dynamics can be observed over various periods of time; longer-term dynamics can be assessed and compared to shorter-term movements; and the evidence regarding a "structural" change in earnings dynamics between the early-1980s and early-1990s can be assessed.

The principal limitation of the LAD file in the context of the present study is that it includes only the information found on (or derived from) the tax files from which the database is constructed. In particular, the LAD is missing some of the key variables required for any detailed analysis of labour market activity, such as wage levels, hours and weeks of work, and other job and worker characteristics. [16] The LAD also lacks some important socio-economic variables, such as level and field of education and family background. The LAD should, therefore, be thought of as one important element in a broader research program which would include work with other databases, perhaps most notably the Survey of Labour Income Dynamics (SLID) just now being released – although with just the single year of data currently available.

Another important consideration to keep in mind is that there was an increase in the proportion of individuals filing tax forms over the period studied, primarily due to the introduction and subsequent enhancement of tax credits.[17] While this improved coverage

[14] The reader is again referred to the discussions in Atkinson *et al* [1992] and OECD [1996] regarding the typical advantages of administrative data over survey data in terms of population coverage and longitudinal tracking, as well as the accuracy of earnings data.

[15] For those matched into families, information pertaining to the other family members and the relevant family totals are appended to individuals' records.

[16] In particular, it is impossible to decompose the source of a change in earnings into a change in hours (or weeks) worked versus a change in the rate of pay. Furthermore, any change in hours can (obviously) not be further broken down into voluntary versus involuntary reductions – either within a given job or due to outright job loss.

[17] The Federal sales tax credit was introduced in 1986, resulting in a moderate jump in the number of filers in that year, but new and generally enhanced federal and provincial credits in subsequent years (including the introduction of the GST tax credit) have continued to affect the number of filers.

means that the LAD has become increasingly representative of the adult population over time, it also has to be kept in mind when making comparisons between earlier and later years, especially since the "new" filers are more likely to have low earnings in any given year and to be less likely to move to higher earnings levels over time. These sample effects will be addressed as the empirical findings are reported below, but the overall assessment is that the changed sample structure does not seem to be especially problematic in the present context.

3.2 The Construction of the Working Samples

The samples used in the analysis were constructed by first imposing the following restrictions on a year-by-year (cross-sectional) basis over the entire 1982-92 period and then creating the dynamic samples from the resulting sets of observations. First, individuals had to have at least $1,000 (1992 constant dollars, as elsewhere) of wage and salary income in the relevant year. We thus cover the general population of earners while excluding those with only very marginal attachment to the labour force.

Second, individuals were excluded from the working sample in a given year if they had more than $1,000 in (gross) self-employment income. On the one hand, self-employment income is often very different in nature from wage and salary income, being more like a return to capital and entrepreneurship than labour market earnings, and also being more amenable to accounting strategies aimed at reducing the amount of tax paid. On these grounds, self-employment income cannot be *included* in an analysis of earnings. In other situations, self-employment income is very much like wage and salary income, effectively constituting a salary paid to oneself; and in these cases, self-employment income cannot be *excluded* from the analysis. Since we can neither safely include nor exclude self-employment income, it was decided to drop individuals with significant amounts of self-employment income from the samples.[18]

Third, individuals under twenty years of age or over sixty-four were excluded. The lower cut-off was adopted to eliminate students and other younger workers with marginal attachment to the labour force, while the upper cut-off is meant to exclude the sort of semi-retirement work which characterizes many older workers, a dynamic which might be interesting in its own right but which does not fit the general purposes of this study.

Finally, full-time post-secondary students were excluded on the grounds that they have only a secondary attachment to the labour force and their earnings do not accurately reflect labour market opportunities. In particular, students are likely to have consistently lower earnings while in school and then enjoy sharp increases after graduation, meaning that both earnings levels and earnings dynamics are likely to be affected. Perhaps most importantly, with enrolment rates rising over the period covered, the inclusion of an increasing proportion of students would limit our ability to disentangle "student effects" from any more fundamental

[18] The exclusion of self-employment income is fairly standard in the literature. See, for example, Gottschalk and Smeeding [1996].

decline in the labour market fortunes of young people.[19] Full-time students were thus excluded on the basis of tax deductions made for tuition and living expenses.[20]

The number of observations in the one percent LAD ranges from 161,000 in 1982 to 203,000 in 1992. The results of applying the selection criteria to the one percent LAD on a year-by-year basis resulted in annual working sample sizes varying from 92,000 to 104,000 observations.[21]

For the mobility analysis, individuals are included in the calculations when they meet the sample inclusion criteria in the specific years under consideration. There are two broad classes of these inclusion rules. In the case of comparisons across specific pairs of years, such as the earnings level transition matrices, individuals must be included in the working samples the two years under consideration but not necessarily in any intervening years. In other cases, such as the calculation of mean earnings or Gini coefficients using earnings averaged over a number of years, individuals must be in the working samples in *all* the relevant years. [22]

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[19] The changed enrolment patterns also introduce another kind of sample selection bias. Namely, if it were generally "higher ability" individuals who were increasingly likely to go to college or university over time, we would expect the mean earnings of the remaining "non-student" young workers to be driven down simply due to these sample selection effects. On the other hand, if going on to post-secondary education were increasingly likely amongst those who experienced or anticipated *low* labour market earnings, the mean earnings of non-student young workers would be driven *up* by the change in the proportion of students over time. Patterns of earnings mobility could be affected in a like manner. Theoretically, one could attempt to control for such sample effects via sample selection correction methods, but such an approach is beyond the scope of this study – and would be a challenging task in any event.

[20] On the surface, the identification of students should be fairly straight-forward, based on the two deductions available for tuition and other education-related expenses. However, there are rules regarding who is eligible for the deductions (full-time versus part-time enrolment and the nature of the course) and opportunities for transferring these deductions to parents or spouses which, along with the changed amounts in the deductions allowed over time and other finer details, make the exercise challenging. Furthermore, while including students in the analysis would lead to one sort of bias, erroneously deleting too many non-students (*e.g.*, part-time students who are primarily in the labour market) would lead to another. Thus, we experimented with a range of selection rules and decided on a set of thresholds which, on the basis of an analysis of individual records and aggregate totals, appeared to comprise a reasonable set of exclusions. The assistance of Myles Zyblock of HRDC is gratefully acknowledged in this regard, including his kindly running various tabulations using different years of Survey of Consumer Finance data so that the relevant comparisons could be made.

[21] See Finnie [1997b] for further documentation of the construction of the working samples.

[22] To give some specific examples, the 1982-83 transition matrices are based on those in the working samples in both 1982 and 1983, while the 1982-92 matrices are calculated using those in the working samples in 1982 and 1992 but not necessarily any other years. Similarly, the Gini coefficients calculated for 1982 depend on all those in the working sample that year, while those calculated using earnings averaged over the 1982-92 period include only individuals in the annual samples all eleven years.

3.3 The Time-Frames and Specific Years of Comparison

Earnings mobility is analysed along a number of time dimensions: shorter- versus longer-term mobility, over the business cycle, and longer-term structural shifts. To sort out these different patterns, it is opportune that the LAD data covers (roughly) one full business cycle, thus allowing us to compare dynamics at various points of the cycle and to compare earlier and later dates under like macro conditions. In particular, 1982 was marked by a recession which continued through 1983 (into 1984 by some indicators), followed by a period of generally sustained growth from 1984 through 1989, and a second recession beginning in early 1990 and lasting through 1992.

More specifically, 1982-83 and 1991-92 are also at roughly comparable trough points in the business cycle and fully span the years covered by the data, permitting useful comparisons over the longest period possible and bringing the analysis up to the most recent period possible. To cover different points in the business cycle and to compare points over the full period covered by the data, the 1985-86 and 1988-89 pairs of years are also considered in the analysis. Longer three-year periods included in the analysis are 1982-84 (in and just coming out of recession), 1987-89 (full growth), and 1990-92 (into and through the most recent recession).

The longer-term dynamics cannot be so easily placed in the context of the business cycle and the full 1982-92 period is simply cut into two equal halves, with 1987 as an overlap year, while the longest-term dynamics that can be analysed are those which occur between the first and last years represented in the data – 1982 to 1992.

3.4 The Choice of the Age Groups and the Treatment of Age in the Analysis

The choice of the age groups used in the analysis was based on three factors: comparability with other published work, the need to keep like groups together, and parsimony. Preliminary analysis of earnings levels and selected dynamics resulted in the selection of the following age groups: "Entry" (20-24 inclusive), "Younger" (25-34), "Prime" (35-54), and "Older" (55-64).[23]

In the static analysis, individuals are simply grouped by their age in the relevant year. In the dynamic analysis, the categories are defined by individuals' ages in the initial year, while older workers must also remain below the upper age cut-off in the later years to be included in the calculations. Thus, the dynamic analysis is based on fixed cohorts that age over the period considered, while the cohorts of older earners change in a systematic fashion as increasingly longer periods are considered and individuals age out of the relevant samples.

[23] The age of the individual is the age reported on the tax forms at the end of the relevant tax/calendar year.

4. The Empirical Findings

4.1 Shifts in Mean Average Earnings by Sex and Age

In other papers, the author discusses the cross-sectional earnings patterns revealed by the LAD data used here.[24] The principal results are that women generally did better than men over this period, that prime age (and older) workers did better than younger ones, and that many of the greatest shifts came during the 1990-92 recession. Thus, Entry Men (20-24) were the big losers over this period, while Entry Women did almost as badly. Younger Men (25-34) held fairly steady until the post-89 recession, at which point their fortunes dropped significantly, while Younger Women were similarly steady through the 1980s but were able to maintain their earnings levels through the early 1990s. The earnings of Prime Men (35-54) basically followed the business cycle and showed a small net gain over the full period covered, while Prime Women experienced strong, steady increases in their mean earnings in all years, including through the most recent recession. Finally, Older Men (55-64) saw their earnings move to a moderate degree with the business cycle and experienced a slight decline from the early 1980s into the early 1990s, while Older Women had steadier earnings over time and a moderate gain from beginning to end.

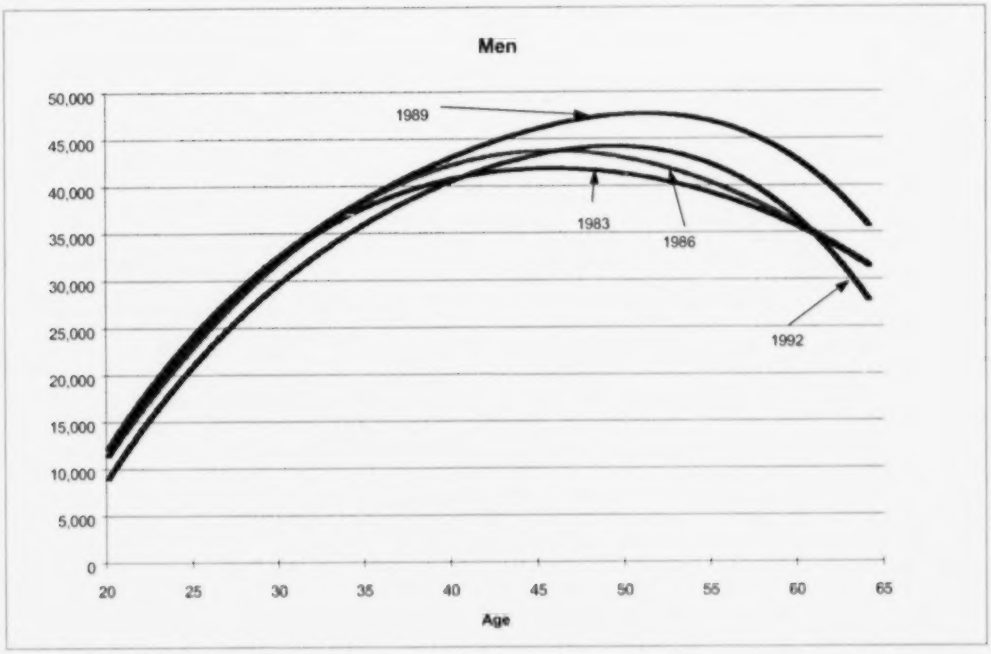
A summary view of the earnings patterns by age and sex is provided by some simple graphs of the related age-earnings profiles. Figure 1 presents these relationships for four selected years: 1983, 1986, 1989, and 1992 (trough, growth, peak, and trough). The graphs are based on regressions of earnings on a higher-order (fourth order) polynomial in age and therefore represent the smoothed "average" age-earnings profiles in each of these four years.

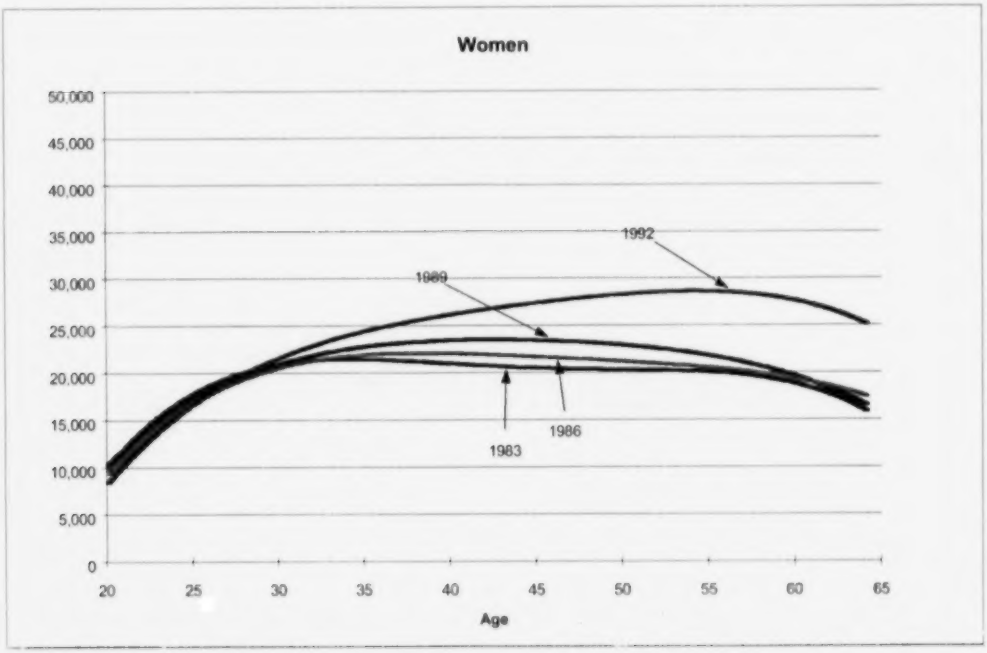
For men, the age-earnings profiles take the conventional "hump" shape, with earnings rising most sharply across the early years, gradually flattening, and then decreasing for older workers. Looking at the shifts in the functions over time, it is apparent that for younger workers (ages 20 to 35), the functions for the first three years are largely indistinguishable, while the significant declines in earnings which occurred for these younger workers in the 1990s then stand out in the 1992 figure. For older workers (over 35), the functions reveal steady upward shifts in earnings through the 1980s, a peak in 1989, and a subsequent decline in 1992, with this latest function crossing through those of the earlier years.

The women's age-earnings functions are interesting, first of all, for their relative flatness over the life cycle as compared to the men's functions. Second, the functions generally shift upward over time – even through the recessionary 1990s. Finally, the shape of the functions also changes over time, reflecting declines in mean earnings for the youngest groups of females workers and large increases for all other women.

[24] See Finnie [1997a,b].

Figure 1 : Age Earnings (1992$) Profile by Sex, Selected





4.2 Analysing Cross-Sectional Earnings Patterns Using the Mean Quintile Index

For this analysis, a measure representing the average place of individuals of a specific sex-age in the overall earnings distribution has been developed. The "mean quintile index" is constructed by assigning individuals the values one through five according to the overall earnings quintile in which they are situated, a one going to those in the bottom quintile, a two to those in the next-to-bottom quintile, and so on, up to a value of five for those in the top quintile. The mean quintile index score for any group is then simply the average of these quintile values for the relevant individuals. Lower scores reflect, on average, relatively lower positions in the overall earnings distribution; higher scores, higher positions.

The quintile index thus represents a summary scalar measure of a group's average place in the overall earnings distribution. This index can be used to analyse earnings patterns in a cross-sectional context, but becomes especially useful in the analysis of earnings mobility. Of course, being a *mean* measure – the *average relative* earnings position – these quintile index scores do not provide information on the *shape* of the earnings distribution which characterizes each group. For example, two individuals in the middle quintile would generate the same mean score as one individual in the top quintile and another at the extreme bottom (both would generate mean scores of 3.0). Nevertheless, the index is especially useful for showing overall levels and trends of earnings on a relative basis, while other measures (*e.g.* detailed quintile, decile, or ventile transition matrices) can be used to investigate changes at a more detailed level.

Table 1 shows the mean quintile index scores on a cross-sectional basis for all earners, for all men and all women, and for the eight sex-age groups over the 1982-92 period covered by this analysis, while the detailed sex-age group scores are also graphed in Figure 2. The principal

Table 1: Summary Quintile Index by Sex and Age*

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Men	3.47	3.44	3.45	3.46	3.46	3.47	3.47	3.47	3.43	3.40	3.36
Women	2.39	2.43	2.43	2.43	2.45	2.44	2.45	2.46	2.50	2.55	2.59
Men											
Entry	2.36	2.26	2.22	2.21	2.18	2.22	2.23	2.21	2.12	2.05	1.95
Younger	3.47	3.41	3.41	3.40	3.38	3.34	3.33	3.31	3.27	3.22	3.18
Prime	3.89	3.89	3.92	3.93	3.93	3.94	3.93	3.91	3.87	3.82	3.79
Older	3.57	3.56	3.54	3.56	3.56	3.55	3.51	3.49	3.45	3.41	3.37
Women											
Entry	2.00	1.96	1.92	1.88	1.86	1.85	1.84	1.82	1.82	1.81	1.75
Younger	2.50	2.56	2.52	2.50	2.49	2.47	2.45	2.44	2.47	2.51	2.54
Prime	2.50	2.57	2.59	2.61	2.64	2.64	2.64	2.66	2.72	2.77	2.83
Older	2.36	2.41	2.41	2.43	2.43	2.41	2.38	2.35	2.38	2.42	2.48

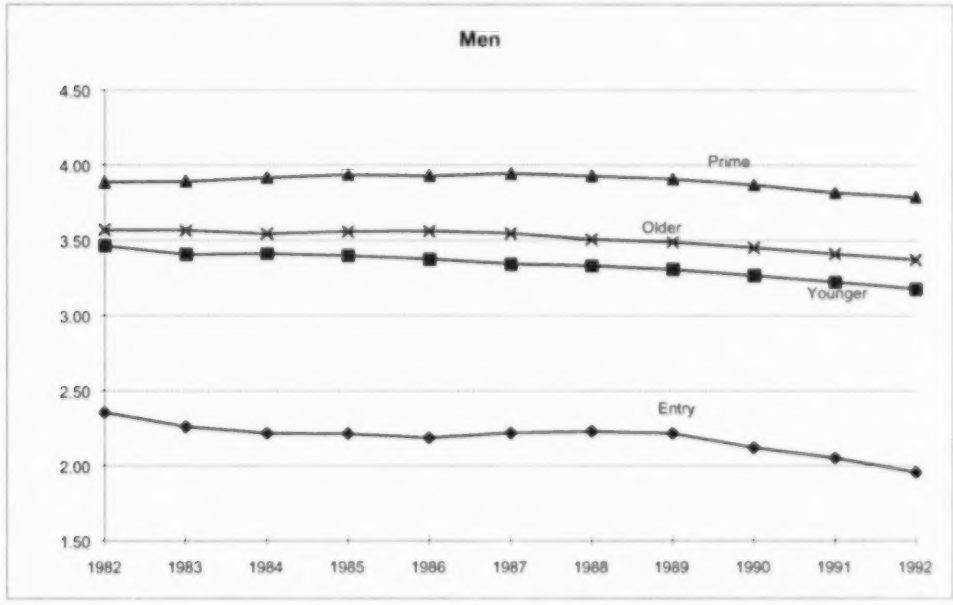
* The figures represent the mean quintile of each age-sex group, with the bottom through top quintiles taking the values 1 through 5 respectively.

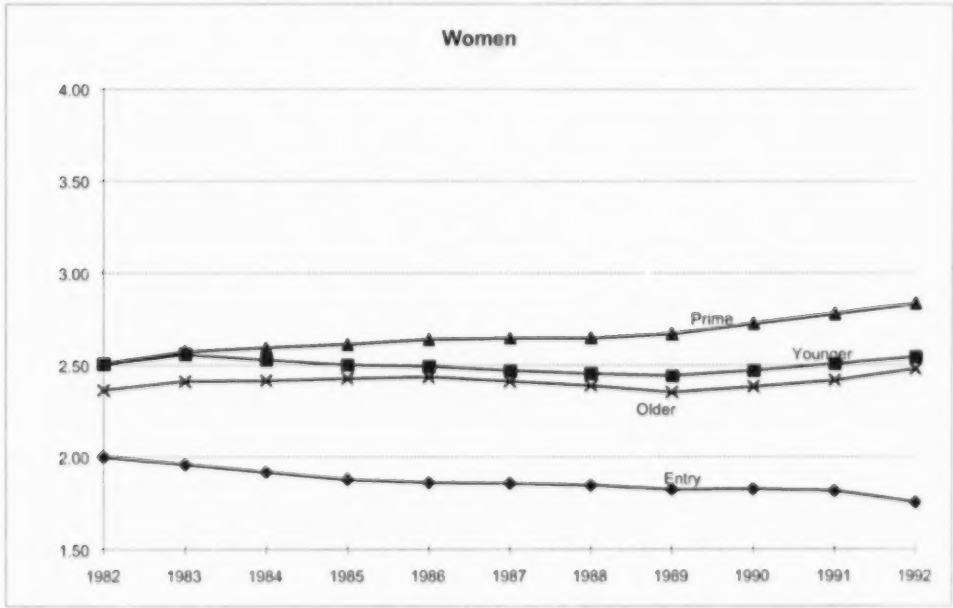
trends seen in the mean real earnings patterns by sex and age described above are now shown in a strictly relative earnings perspective (with the effects of the business cycle on overall earnings levels thus eliminated from the comparisons).

Thus, the average relative position held in the earnings distribution declined for *each* of the male groups across the 1983-92 comparison years. This is especially true for Entry and Younger Men, who were already seen to have experienced real earnings declines, but now includes Prime and Older Men, whose relative declines contrast with the smallish increases in real earnings observed above.

Amongst Women, the mean quintile index scores increased substantially for the Prime group, rose more moderately for the Older group, increased very slightly for the Younger group, and fell substantially for the Entry group. On the other hand, despite the strong gender patterns of these changes, the *levels* of the quintile index scores remained substantially higher for men than women at all ages. More specifically, in the last year of data the relative scores were 1.95 versus 1.75 for Entry Men and Women, 3.18 versus 2.54 for Younger Men and Women, 3.79 versus 2.83 for the Prime groups, and 3.37 versus 2.48 for the Older workers.

Figure 2: Summary Quintile Index, Annual Basis





Source : Table 1

4.3 Correlation Coefficients

We begin the analysis of earnings mobility by looking at the correlation coefficients of real earnings over intervals of one, two, and five, and over the full ten years facilitated by the LAD data. Both Pearson and Spearman (rank order) coefficients are shown, with the latter generally more robust in the present circumstances where all earners are included due to its distributional orientation. The full set of results across the various intervals and periods of comparison is presented in Table 2a, while the one-year Spearman correlations by sex and age are shown for all years 1982-92 in Figure 3.

The first point to make is that the correlation coefficients are all far from the zero levels which would have indicated that earnings were completely independent from one year to another. The one-year Spearman correlations, upon which we focus for most of this discussion, are mostly in the 0.80-0.90 range, the two-year correlations mostly in the 0.75-0.85 range, the five-year correlations mostly in the 0.60-0.75 range, and the ten-year correlations mostly in the 0.50-0.60 range (with Entry Men and Women characterized by lower correlations throughout, as discussed further below). That is, earnings are "significantly" correlated for all groups of workers: those with relatively high earnings in one year tended to have relatively high earnings in other years and *vice versa*.

A second general finding is that earnings are less correlated across longer periods of time – hardly surprising, and consistent with the findings reported in OECD [1996] and Atkinson *et al* [1992]. More interesting, is that the results indicate that there is a decreasing mobility of earnings over longer periods of time, with the longer-term correlations higher than what would be obtained were the changes (statistically) independent from one year to the next – something we might term "decreasing marginal mobility" over longer periods of time.

That is, while a series of independent year-to-year processes would generate longer-term correlations equal to the one-year correlations raised to the relevant number of years, the actual correlation coefficients are greater than this. For example, one-year correlations of 0.89 (the modal value for the one-year Spearman measures) would imply a two-year correlation of $0.89^2=0.79$ if the processes were independent from the first year to the second, whereas the actual two-year correlations are 0.82-0.83 over the three periods shown in the table. This decreasing instability is even more apparent over the longer time frames: whereas a process that was independent from year-to-year would imply a five-year correlation coefficient of 0.56, the actual value is 0.71. Moreover, over ten-years, the 0.59 correlation coefficient is much greater than the 0.31 value which an independent process would imply (still using the 0.89 one-year correlation as the base coefficient).

Thus, we can roughly say (adopting the phraseology used in OECD [1996]) that just under 90 percent of the overall earnings inequality observed in a given year is carried over to the next. Moreover, while there is greater mobility over greater numbers of years, the increases in mobility occur at a diminishing rate over longer intervals. Thus, 82-83 percent of the overall inequality which exists on an annual basis persists over a two-year period, 71 percent over five years, and 59 percent of the earnings inequality in a given year persists ten years later.

Table 2a: Correlation Coefficients by Sex and Age

Spearman

	Period of Dynamics									
	One Year				Two Years			Five Years		Ten Years
	1982-83	1985-86	1988-89	1991-92	1982-84	1987-89	1990-92	1982-87	1987-92	1982-92
All	0.88	0.89	0.89	0.89	0.82	0.83	0.83	0.71	0.71	0.59
Men	0.87	0.89	0.89	0.89	0.81	0.83	0.83	0.69	0.70	0.57
Women	0.85	0.85	0.85	0.87	0.78	0.77	0.80	0.63	0.65	0.51
Men										
Entry	0.77	0.79	0.77	0.77	0.68	0.65	0.66	0.51	0.46	0.38
Younger	0.85	0.88	0.87	0.87	0.79	0.80	0.81	0.69	0.69	0.60
Prime	0.88	0.90	0.90	0.90	0.83	0.85	0.84	0.74	0.75	0.63
Older	0.83	0.86	0.86	0.83	0.75	0.78	0.74	0.56	0.57	-
Women										
Entry	0.77	0.77	0.75	0.76	0.65	0.62	0.67	0.43	0.42	0.30
Younger	0.83	0.82	0.81	0.81	0.75	0.73	0.75	0.61	0.61	0.53
Prime	0.89	0.89	0.90	0.90	0.84	0.84	0.85	0.72	0.73	0.58
Older	0.88	0.89	0.84	0.88	0.85	0.77	0.81	0.66	0.64	-

Pearson

	Period of Dynamics									
	One Year				Two Years			Five Years		Ten Years
	1982-83	1985-86	1988-89	1991-92	1982-84	1987-89	1990-92	1982-87	1987-92	1982-92
All	0.85	0.88	0.85	0.84	0.81	0.63	0.67	0.65	0.52	0.57
Men	0.83	0.86	0.86	0.82	0.78	0.59	0.65	0.62	0.48	0.54
Women	0.87	0.87	0.87	0.89	0.81	0.79	0.83	0.63	0.66	0.50
Men										
Entry	0.79	0.81	0.79	0.80	0.69	0.67	0.72	0.52	0.47	0.38
Younger	0.83	0.85	0.76	0.85	0.77	0.68	0.80	0.60	0.65	0.51
Prime	0.82	0.86	0.68	0.77	0.76	0.54	0.48	0.64	0.48	0.57
Older	0.81	0.84	0.95	0.94	0.80	0.62	0.93	0.55	0.48	-
Women										
Entry	0.79	0.80	0.78	0.80	0.67	0.64	0.71	0.44	0.43	0.30
Younger	0.84	0.85	0.83	0.83	0.77	0.75	0.78	0.61	0.63	0.54
Prime	0.90	0.91	0.90	0.91	0.86	0.82	0.86	0.68	0.69	0.51
Older	0.89	0.80	0.85	0.90	0.85	0.74	0.81	0.67	0.56	-

A third interesting aspect of the correlation findings is the patterns by age, with the most obvious empirical regularity being that the correlation coefficients are significantly lower for Entry Men and Entry Women than those in the older age groups – again, not surprising and consistent with the findings of others. Beyond this, the close proximity of the coefficients for the Younger, Prime, and Older groups is noteworthy (*e.g.*, all one-year correlations are in the 0.85-0.90 range for men of different ages, while reaching somewhat lower levels for the different female groups.)

As for gender patterns, expectations, like others' findings (see below), could have gone either way. What is found here is that, first taking men and women of all ages together (the second and third rows in the tables), correlation coefficients are moderately higher for men than women, especially over the longer time periods. At a more detailed level, the gender patterns vary significantly by age group. Not surprisingly, Younger Men's earnings were relatively more highly correlated over time than were those of Younger Women, reflecting the former's more stable labour force attachment at this phase of the life cycle. For the Entry groups, Men again tended to have more stable earnings than Women over the longer periods of time – but not for the one-year correlations – and presumably for similar reasons as was the case for the Younger groups.[25]

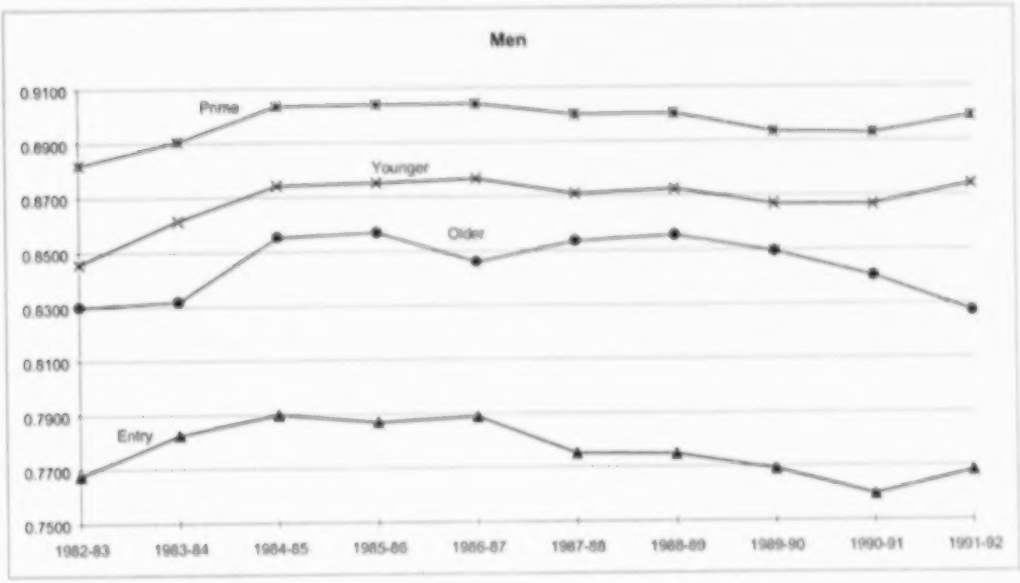
However, the correlation patterns of earnings of Entry Men and Women and the greater stability amongst Younger Men relative to Younger Women indicate different underlying "types" of mobility by gender. In particular, we shall see below that Entry and Younger Men were considerably more likely to move up the earnings distribution over time than were Entry and Younger Women, while the female groups exhibited relatively more "churning" (short-term fluctuations) than did the male ones. These are obviously important differentiations to make when evaluating mobility patterns – hence the need to go beyond correlation coefficients to gain any full understanding of earnings dynamics.

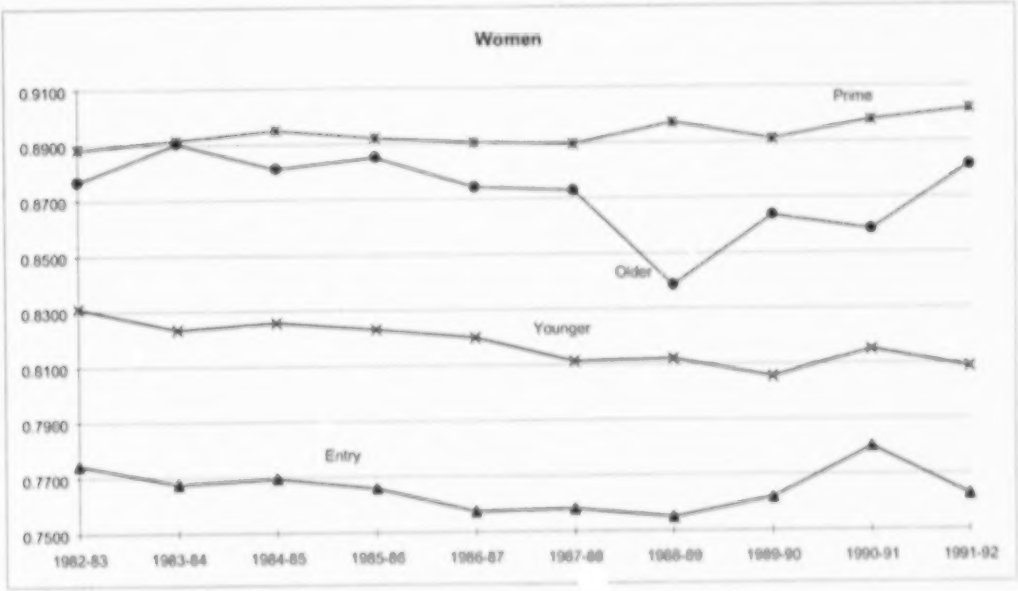
Similarly, while the relative similarity of the correlation coefficients for Prime Men and Women seen in Table 2a and Figure 3 might at first be taken to indicate comparable labour market mobility patterns after the mid-30's (albeit at different earnings *levels*), we will see below that the types of mobility underlying these overall correlations represent – churning versus trend mobility – differ significantly by sex. Finally, amongst Older workers the shorter-term correlations have no consistent gender pattern, but Older Women's earnings were more stable than Older Men's over the two five-year periods. The above trend probably reflects men's greater tendency to move through a period of semi-retirement before leaving the labour market altogether (recall the drop-off in the age-earnings profiles of men versus the relative flatness of women seen above).

A final point regarding the correlation coefficients, and perhaps most interesting of all, is that there was no clear pattern of changes over the 1982-92 period. For example, the one-year correlations do not vary by more than three points and show no clear time trends for any of the age-sex groups across the four pairs of years shown in the table. Furthermore,

[25] Recall that the cohorts age across the time-periods under consideration, meaning that the Entry groups are 30-34 by the end of the 1982-92 ten-year period, clearly a different phase of the life cycle than at the beginning.

Figure 3: Spearman Correlation Coefficients





Source : Table 2a

these periods represent various points in the business cycle and across which there has been substantial change in labour markets in general. This stasis is more fully revealed in Figure 2, which plots the one-year correlations for all pairs of years 1982-92.

The relative stability of the correlation coefficients over time is also apparent in the three sets of two-year correlations shown in the table, with the two five-year periods also following suit. The only exception is the case of Entry Men, for whom the 1987-92 five-year correlation coefficient is five points lower than the 1982-87 correlation. This latter shift could represent a change in trend mobility (presumably an increase in general upward earnings mobility, increased churning around given means, or a combination of the two – again, the correlation coefficients cannot tell us).

In concluding this section, it needs to be noted that the Pearson correlation coefficients often differ from the rank-order Spearman coefficients upon which the preceding discussion is based. It was stated at the outset that the Spearman measures were preferable to the Pearson scores due to their rank-order basis and associated robustness. Moreover, a more detailed analysis of earnings patterns suggests that there are indeed outlier earnings values in the data which could throw off the Pearson results. That said, there are no obvious explanations for the sometimes substantial differences in the two sets of results.

4.3.1 The Correlation Coefficients in an International Perspective

The five-year correlation coefficients are the most directly comparable to the benchmark results reported in the recent OECD survey (OECD [1996], p. 85). For all male and female workers taken together (not just full-time, full-year workers), the Spearman (rank) correlations of 0.71 over both the 1982-87 and 1987-92 periods and the Pearson coefficients of 0.65 and 0.52 compare to Pearson coefficients in the range of 0.62 (Denmark) to 0.78 (Italy), with a mean of 0.72, for seven of the eight OECD countries included in the survey. [26]

Thus, allowing for the possibility that the 1987-92 Pearson coefficient might be something of an outlier (see above) and taking into account that the Spearman (rank) correlations have a general tendency to be higher than the Pearson correlations would allow us to conclude that the overall five-year earnings correlations in Canada have been towards the lower end of what has obtained in comparable OECD countries over the same number of years and approximately the same period of time.[27]

It is worth breaking these cross-national comparisons down by gender. For men, the Spearman (rank) correlations of 0.69 and 0.70 for the 1982-87 and 1987-92 periods

[26] Finland is deemed to be an outlier in the OECD results due to the specific characteristics of their data and is therefore excluded from the comparisons made below. See the OECD report, as well as the discussions in Section II of this paper, for issues relating to cross-national comparisons.

[27] The 0.65 Pearson coefficient for the 1982-87 period is above that of Denmark (0.62), but below those of the other six countries: France (0.72), Germany (0.78), Italy (0.78) Sweden (0.74), United Kingdom (0.73), and the United States (0.69). The 0.71 Spearman correlation coefficients would of course place Canada at a higher relative rank.

respectively (and a Pearson correlation coefficient of 0.62 over the 1982-87 period) compare with Pearson correlation coefficients in the 0.63 to 0.79 range and a mean of 0.70 in the OECD countries (with Denmark and Italy the limiting cases), again placing Canada towards the lower end in terms of the cross-national rankings of earnings stability – or near the top if we prefer to think in terms of earnings mobility.

For women, the five-year Spearman coefficients of 0.63 and 0.65 and Pearson coefficients of 0.63 and 0.66 (note the small difference of the two) compare to a range of 0.42 (Denmark) to 0.72 (the United Kingdom) and a mean of 0.62 in the OECD countries. Thus, the stability of earnings amongst all women in Canada is in the middle range of what has been found in the OECD comparison countries.

As for the relative mobility of men and women, the OECD study only permits comparisons for all men and women taken together, not broken down by age: "Earnings mobility among persistently full-time workers [and also amongst part-time, part-year workers] is moderately higher for women than for men in Denmark, Finland, France, Germany, and Italy, but a bit lower in Sweden and the United Kingdom, and about the same in the United States" (p. 83). Thus, the mixed gender patterns found for Canada as reported above are not out of line with what has been found elsewhere.

Other comparisons with the OECD survey or with other published work could be made but are probably not worth the effort due to the general limitations of such cross-national comparisons (as discussed in Section II of this paper) and due to the lack of directly comparable findings. For example, the OECD review gives results by age and across shorter periods of time, but these are for full-time, full-year workers only and are reported only with both men and women grouped together. The results reported here include those working part-time and part-year and the most interesting results are for the breakdowns by age provided throughout. Suffice it to say the results reported here are broadly consistent with what has been found elsewhere, particularly with respect to sex (as just noted), age, and the number of years across which the correlations are calculated.

We conclude that Canada is somewhere in the middle of the OECD countries covered in the OECD survey in terms of correlation coefficients – with men having somewhat lower correlations than average, and women laying more squarely in the middle rank.

4.3.2 Checking Dynamic Sample Bias in Terms of Correlation Coefficients

One problem with comparing correlation coefficients across different numbers of years is that the samples are constantly changing, since the calculations are based on those in the sample the specific number of years under consideration. The results therefore reflect sample composition effects along with the true time patterns. One easy way to check this bias is to compare the shorter- and longer-term correlation coefficients using only those individuals who are in the sample the greater number of years.

Table 2b shows selected one-, two-, five-, and ten-year correlation coefficients (all using 1982 as the first year in the correlation calculation) obtained when the samples are restricted to those present all eleven years – the most extreme restriction. The correlation coefficients are uniformly higher when the longer-term sample criterion is used, indicating greater earnings stability – less mobility – amongst those in the labour market for longer periods of time, for women as much as for men. Furthermore, the differences tend to be greater for the longer-term dynamics, indicating particularly enhanced longer-term earnings stability (or less mobility) for those persistently in the labour market over a longer period of time.

However, these results do not change the general observations regarding shorter- versus longer-term dynamics made above: the correlation coefficients still decline with the number of years considered, and in a way which indicates diminishing mobility over time (precise calculations not shown). The other principal findings regarding the general levels of the coefficients and the patterns by age and sex also hold.[28] Similar results hold over other sets of restrictions and over different combinations of years, allowing us to conclude that dynamic sample bias is probably not much of a problem for at least this section of the analysis – and probably not for the other elements of the dynamic analysis either.

Table 2b: Spearman Correlation Coefficients by Sex and Age for Individuals in the Sample All Eleven Years, by Age and Sex

	Period of Dynamics			
	One Year	Two Years	Five Years	Ten Years
	1982-83	1982-84	1982-87	1982-92
All	0.90	0.85	0.76	0.63
Men	0.89	0.83	0.74	0.59
Women	0.87	0.81	0.69	0.55
Men				
Entry	0.79	0.71	0.54	0.43
Younger	0.86	0.80	0.71	0.63
Prime	0.90	0.85	0.78	0.65
Older	-	-	-	-
Women				
Entry	0.79	0.68	0.49	0.34
Younger	0.85	0.77	0.66	0.56
Prime	0.91	0.88	0.76	0.61
Older	-	-	-	-

[28] Indeed, even if there were significant differences across the different sample constructions in these regards, they would really only represent alternative perspectives of earnings mobility (*i.e.*, for different sub-samples of earners). This is because the patterns of shorter-term dynamics are probably best analysed with samples that include all those experiencing those dynamics, rather than looking only at those in the samples for an extended period of time.

4.4 Relative Earnings Mobility: The Average Quintile Jump

We now turn to the results based on quintile transitions, thus tracking individuals' places in the overall earnings distribution over time – earnings dynamics in a *relative* or *distributional* perspective. We begin with the "average jump", a very simple measure representing the mean number of quintiles moved from one year to another. It is a widely used indicator but, like correlation coefficients, lacks any indication of the *direction* of change. Neither does the measure have general intuitive benchmarks representing "perfect mobility" and "perfect immobility" (see OECD [1996] and Atkinson *et al* [1992] for discussions of these issues). Nevertheless, it is a simple summary measure which also lends itself to international comparisons.

Table 3a shows the average quintile jumps by sex and age across different intervals and time periods. The findings are similar to the mobility patterns represented in the correlation coefficients described in the preceding section (with lower correlations corresponding to greater jumps) but there are some differences as well. We find a relatively high degree of stability of earnings from one year to another; greater movement over longer periods of time; and greater jumps amongst the Entry groups than the Older cohorts. Moreover, there appears to be less mobility for Younger Men and Women and Older Men relative to the Prime groups than was the case with the correlation coefficients; and mixed patterns by gender, but a somewhat different mix than for the correlation coefficients. Perhaps most importantly, there is no clear general shift over the decade covered by the data.

Table 3a: Average Quintile Jumps by Sex and Age

	Period of Dynamics									
	One Year				Two Years			Five Years		Ten Years
	1982-83	1985-86	1988-89	1991-92	1982-84	1987-89	1990-92	1982-87	1987-92	1982-92
All	0.40	0.37	0.38	0.38	0.51	0.50	0.49	0.72	0.71	0.92
Men	0.42	0.38	0.39	0.39	0.53	0.51	0.50	0.72	0.70	0.90
Women	0.38	0.36	0.37	0.37	0.48	0.50	0.49	0.71	0.72	0.94
Men										
Entry	0.55	0.51	0.53	0.46	0.74	0.75	0.65	1.12	1.06	1.38
Younger	0.45	0.42	0.42	0.41	0.56	0.55	0.53	0.73	0.72	0.84
Prime	0.36	0.31	0.31	0.34	0.44	0.40	0.43	0.56	0.56	0.74
Older	0.43	0.39	0.42	0.46	0.54	0.56	0.62	0.81	0.91	-
Women										
Entry	0.42	0.41	0.40	0.38	0.56	0.58	0.57	0.84	0.90	1.09
Younger	0.44	0.43	0.44	0.46	0.56	0.56	0.57	0.77	0.78	0.97
Prime	0.33	0.31	0.32	0.32	0.41	0.43	0.42	0.61	0.63	0.84
Older	0.29	0.29	0.30	0.30	0.35	0.44	0.41	0.59	0.62	-

We can compare the results with situations in other countries based on the OECD survey. For all male and female earners taken together (including part-time, part-year workers), the five-year average jumps of 0.72 (1982-87) and 0.71 (1987-92) compare with an OECD range of 0.65 (Germany) to 0.81 (Denmark) and a mean of 0.70. For All Men, the 0.72 and 0.70 values found here (the same periods) compare to an OECD range of 0.65 to 0.77 (the same top and bottom countries) and a mean of 0.69. For All Women, the 0.71 and 0.72 values compare to an OECD range of 0.64 to 0.86 (Germany and Denmark are again the limiting cases) and a mean of 0.72. Thus, by the average quintile jump, Canadian earnings mobility is very much in the middle of the OECD pack.

4.4.1 Quintile Jumps by Starting Quintile

Table 3b offers an initial view of earnings dynamics conditioning on the starting position, although at a very aggregate level, taking all earners – men and women of all ages – together.[29] This is done for two reasons: in order to paint a more detailed picture of mobility patterns across the different ranges of the earnings distribution (by group), and due to the necessity of taking into account the different statistical properties of earnings movements according to the starting point. For example, it is impossible for individuals to move to a higher earnings quintile if they are already at the top, and cross-group comparisons will generally be distorted if the underlying distributions are not taken into account in this manner.

Table 3b: Average Quintile Jumps by Starting Quintile, All Earners

	Period of Dynamics									
Starting	One Year				Two Years			Five Years		Ten Years
Quintile	1982-83	1985-86	1988-89	1991-92	1982-84	1987-89	1990-92	1982-87	1987-92	1982-92
Top	0.23	0.18	0.19	0.20	0.28	0.25	0.29	0.36	0.42	0.51
Fourth	0.40	0.35	0.37	0.38	0.47	0.47	0.51	0.62	0.67	0.76
Third	0.44	0.42	0.43	0.43	0.53	0.55	0.54	0.73	0.74	0.91
Second	0.49	0.48	0.48	0.47	0.63	0.62	0.58	0.87	0.82	1.08
Bottom	0.48	0.46	0.46	0.44	0.69	0.67	0.59	1.10	1.01	1.44

The important general points to be made here are that there is greater earnings mobility for those who begin at lower earnings quintiles and that these differences are more delineated over the longer intervals. Thus, there is greater earnings stability at the top and greater mobility at the bottom and while there is more movement over longer periods of time everywhere, the increases in mobility over time are greater from lower earnings levels than from higher ones.

[29] Results broken down by age and sex are available from the author.

Finally, Tables 3c and 3d extend the exercise which began with the correlation coefficients in showing the average quintile jumps using only those in the sample all eleven years. This is done primarily in order to provide a further test for dynamic sample bias, but also to provide an alternative set of results (based on the different sample basis) of the average jump measure. Most important here is that the basic patterns over time hold with these alternative specifications, although there is a different, somewhat more complicated, set of differences across the two sets of findings than was the case when this test was performed with the correlation coefficients.

Table 3c: Average Quintile Jumps by Sex and Age for Individuals in the Sample All Eleven Years

	Period of Dynamics			
	One Year	Two Years	Five Years	Ten Years
	1982-83	1982-84	1982-87	1982-92
All	0.35	0.45	0.64	0.83
Men	0.38	0.49	0.67	0.87
Women	0.31	0.39	0.59	0.77
Men				
Entry	0.47	0.61	0.94	1.16
Young	0.41	0.52	0.68	0.79
Prime	0.33	0.43	0.57	0.84
Older	-	-	-	-
Women				
Entry	0.32	0.40	0.63	0.85
Young	0.35	0.46	0.63	0.80
Prime	0.27	0.33	0.53	0.71
Older	-	-	-	-

Table 3d: Average Quintile Jumps by Starting Quintile for Individuals in the Sample All Eleven Years

	Period of Dynamics			
Starting	One Year	Two Years	Five Years	Ten Years
Quintile	1982-83	1982-84	1982-87	1982-92
Top	0.21	0.29	0.40	0.68
Fourth	0.38	0.47	0.64	0.83
Third	0.42	0.51	0.72	0.86
Second	0.43	0.52	0.72	0.84
Bottom	0.33	0.46	0.69	0.93

4.4.2 Measuring Earnings Mobility Using the Mean Quintile Index

While this paper addresses "earnings mobility" in general, a useful differentiation can be made between "churning mobility" and "trend mobility." The former can be thought of as the movement of individuals' earnings around fixed mean levels, the latter as general trends of earnings over time, especially as they relate to the life cycle. Thus, younger workers tend to have greater churning around a generally upward-sloping trend line while more mature workers have more stable earnings around a flatter range of the age-earnings profile.

What is most important to understand is that correlation coefficients do not differentiate churning and trend earnings mobility and generally provide no information regarding the *direction* of earnings movements, thus limiting comparisons of earnings mobility across groups and over time. For example, relatively stable correlation coefficients could reflect the offsetting influences of more churning and less upward mobility – two very different things.[30]

Here, this differentiation is accomplished in an informal manner by explicitly looking at trend mobility using the mean quintile index measure introduced above, thus abstracting from the "churning" element and providing a fuller portrait of earnings dynamics – the extent and direction of the mobility – over time.

Table 4a shows the mean quintile index for all earners taken together (the first panel), and by sex-age group using individuals' positions in the distribution of earnings in 1982 as the starting point, thus depicting the broad movements in earnings over time by initial quintile. Figure 4a shows the sex-age patterns graphically.

While we might initially have expected a gradual convergence towards the middle of the earnings distribution, as those at the top moved down and those at the bottom moved up over time (a score of 3.0 would represent average placement in the middle quintile), this is not the case. Instead, the first set of numbers reveals general stability at the top versus upward movements, on average, of those who start in the lower quintiles. For example, after just one year, the 1.48 value for those who started in the bottom quintile indicates that this group had, *on average*, moved towards being equally distributed in the bottom and second quintiles (an exact split would have generated a mean index score of 1.50).[31]

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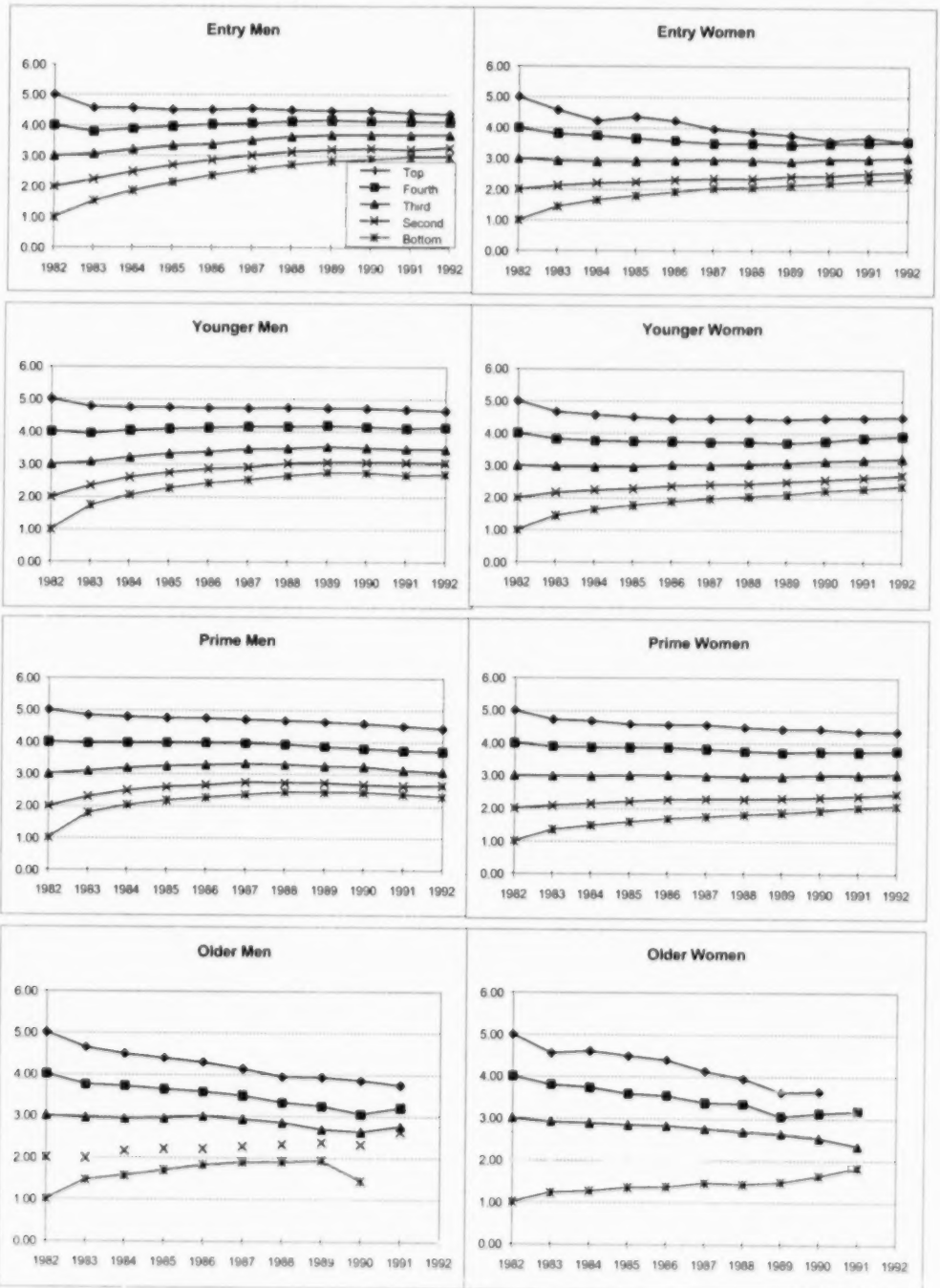
[30] Gittleman and Joyce [1995] refer to the sometimes ambiguous attitudes towards earnings movements in terms of representing "mobility", which is often considered as being desirable, and "instability", which is viewed less favourably. The differentiation into churning and trend mobility helps focus the relevant issues. The Gottschalk and Moffitt [1994] paper, discussed above, provides a clear discussion of these concepts as they estimate the variance of earnings around life-cycle-related earnings levels.

[31] Again, this is the *average* score reflecting broad trends in the quintile dynamics. In reality, individuals are distributed across all five quintiles in the second year (as previously seen), and it is this full distribution which generates the average score.

Table 4a: Quintile Changes Using the Summary Quintile Index, 1982 Base Year

Quintile	Quintile Index in Subsequent Year										
in 1982	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
All											
Top	5.00	4.77	4.72	4.69	4.67	4.64	4.62	4.60	4.58	4.53	4.49
Fourth	4.00	3.89	3.91	3.92	3.93	3.93	3.92	3.91	3.89	3.88	3.90
Third	3.00	3.01	3.06	3.11	3.15	3.18	3.19	3.21	3.23	3.22	3.24
Second	2.00	2.16	2.30	2.38	2.47	2.54	2.58	2.63	2.66	2.70	2.76
Bottom	1.00	1.48	1.69	1.86	1.99	2.10	2.19	2.26	2.33	2.39	2.44
Entry Men											
Top	5.00	4.57	4.56	4.50	4.51	4.55	4.50	4.47	4.47	4.41	4.38
Fourth	4.00	3.80	3.89	3.96	4.03	4.07	4.13	4.17	4.14	4.13	4.12
Third	3.00	3.07	3.21	3.33	3.38	3.51	3.63	3.69	3.69	3.68	3.68
Second	2.00	2.24	2.49	2.70	2.86	3.01	3.14	3.21	3.25	3.21	3.27
Bottom	1.00	1.54	1.86	2.14	2.36	2.56	2.72	2.83	2.89	2.97	2.97
Younger Men											
Top	5.00	4.78	4.75	4.75	4.72	4.72	4.74	4.72	4.71	4.68	4.65
Fourth	4.00	3.95	4.04	4.09	4.12	4.16	4.16	4.19	4.15	4.11	4.13
Third	3.00	3.07	3.21	3.32	3.39	3.47	3.49	3.54	3.50	3.47	3.48
Second	2.00	2.35	2.60	2.74	2.86	2.91	3.03	3.06	3.08	3.06	3.05
Bottom	1.00	1.74	2.06	2.26	2.42	2.52	2.64	2.75	2.74	2.67	2.70
Prime Men											
Top	5.00	4.83	4.78	4.75	4.74	4.70	4.66	4.63	4.58	4.50	4.42
Fourth	4.00	3.96	3.97	3.97	3.97	3.96	3.93	3.86	3.80	3.73	3.70
Third	3.00	3.09	3.19	3.25	3.28	3.32	3.29	3.25	3.23	3.12	3.06
Second	2.00	2.29	2.48	2.59	2.65	2.74	2.72	2.72	2.66	2.63	2.64
Bottom	1.00	1.78	2.03	2.17	2.26	2.36	2.44	2.43	2.43	2.37	2.30
Older Men											
Top	5.00	4.64	4.49	4.39	4.29	4.13	3.94	3.93	3.85	3.74	-
Fourth	4.00	3.75	3.72	3.64	3.57	3.49	3.32	3.23	3.04	3.20	-
Third	3.00	2.96	2.93	2.94	2.99	2.92	2.84	2.68	2.62	2.75	-
Second	2.00	1.99	2.16	2.21	2.21	2.27	2.32	2.36	2.32	2.62	-
Bottom	1.00	1.47	1.57	1.70	1.82	1.89	1.90	1.93	1.44	-	-
Entry Women											
Top	5.00	4.57	4.22	4.35	4.22	3.96	3.85	3.75	3.58	3.68	3.55
Fourth	4.00	3.81	3.74	3.65	3.57	3.49	3.48	3.44	3.49	3.52	3.55
Third	3.00	2.93	2.90	2.92	2.93	2.95	2.94	2.89	2.96	2.99	3.03
Second	2.00	2.12	2.21	2.24	2.30	2.34	2.35	2.42	2.45	2.53	2.58
Bottom	1.00	1.44	1.65	1.79	1.92	2.03	2.06	2.13	2.21	2.29	2.36
Younger Women											
Top	5.00	4.66	4.57	4.51	4.46	4.46	4.46	4.43	4.47	4.48	4.51
Fourth	4.00	3.82	3.77	3.75	3.74	3.72	3.73	3.70	3.76	3.85	3.92
Third	3.00	2.97	2.96	2.96	3.02	3.01	3.05	3.08	3.14	3.18	3.22
Second	2.00	2.16	2.24	2.28	2.36	2.41	2.43	2.49	2.56	2.63	2.71
Bottom	1.00	1.44	1.63	1.77	1.88	1.97	2.04	2.10	2.22	2.29	2.37
Prime Women											
Top	5.00	4.72	4.67	4.59	4.56	4.56	4.49	4.43	4.44	4.36	4.36
Fourth	4.00	3.90	3.87	3.86	3.85	3.81	3.76	3.71	3.74	3.73	3.77
Third	3.00	2.99	2.99	3.01	3.02	2.99	2.97	2.98	3.03	3.03	3.06
Second	2.00	2.08	2.15	2.21	2.27	2.29	2.29	2.31	2.34	2.38	2.46
Bottom	1.00	1.35	1.48	1.59	1.68	1.75	1.81	1.87	1.94	2.03	2.08
Older Women											
Top	5.00	4.55	4.60	4.48	4.39	4.13	3.94	3.62	3.64	-	-
Fourth	4.00	3.80	3.73	3.59	3.54	3.37	3.34	3.05	3.12	3.17	-
Third	3.00	2.91	2.88	2.84	2.82	2.75	2.68	2.63	2.53	2.34	-
Second	2.00	1.97	1.98	2.01	2.00	1.99	1.96	1.93	1.94	1.93	-
Bottom	1.00	1.32	1.27	1.35	1.37	1.46	1.43	1.48	1.63	1.82	-

Figure 4a: Quintile Changes Using The Summary Quintile Index, 1982 Base Year



Source : Table 4a

The rates of movement over time are also interesting. For those starting at the bottom, for example, the movements are greatest initially and last right through the eleven year period covered by the data. By the final year covered by the data, those who started in the bottom quintile had, on average, moved to a place somewhere near the middle of the earnings distribution (a change in the mean quintile index from 1.00 to 2.44). There was, conversely, much more stability at the top of the earnings distribution. For example, those who started in the top quintile tended to remain in the upper reaches of the earnings distribution, with the mean quintile score falling only slightly, from 5.00 to 4.49 over the full interval. In short, there were generally quite significant upward movements from the lower and middle quintiles and very moderate declines from the top downward.

The patterns by age and sex shown in the other panels of the table are perhaps even more interesting, reflecting the different career stages of these groups. These are also shown in Figure 4a. The results show that Entry Men had, on average, the greatest upward movement in earnings over time. For example, the 2.97 score in 1992 for those who started in the bottom quintile in 1982 indicates that the earnings of this group had, on average, risen to the third (middle) quintile by the later year. Prime Men and Women had less upward mobility than the Entry and Younger groups, reflecting their relatively entrenched positions in the labour market by this stage of life. In contrast, and for similar reasons, Prime Men (in particular) who started in the higher quintiles had the highest final quintile indexes of all groups, that is, they tended to maintain their high earnings levels more than those in other sex-age groups. The patterns for Older Men reflect a peaking of earnings and movement into the pre- and semi-retirement years, while those of Older Women reflect offsetting factors related to secular increases in their labour force attachment versus similar life-cycle effects as in the case of men.

Table 4b shows the mean quintile index results for all years for all earners taken together (that is, using each year as a new base year for the subsequent dynamics). The key result here is a trend towards reduced upward mobility in later years while stability at the top was generally maintained.[32] Note that these figures track not only the average quintiles in which individuals are situated in *later* years, but also from whence they *came*.

Finally, Table 4c shows the quintile dynamics using the mean quintile index for the eight sex-age groups with 1989 as the base year, allowing us to assess any broad changes in quintile movements in the later years by comparing these results with those previously found using 1982 as the base year (Table 4a). The comparable mean quintile scores for the first three years for the different start years are shown in Figure 4b.

Most interestingly, the general themes already identified in terms of sex and age are revisited: improvements for women over men, and for prime age workers relative to younger ones. For example, looking at the quintile indexes in the years following 1983 and 1990 (1990-91-92 versus 1983-84-85 being comparable), we see that the quintile index is lower for Entry Men in the latter period for all starting quintiles as one moves forward in time from the

[32] Years should be compared in terms of their relation to the base year – for example, when using 1990 as the base year, 1991 is the "first" year, comparable to 1983 when 1982 is taken as the base year.

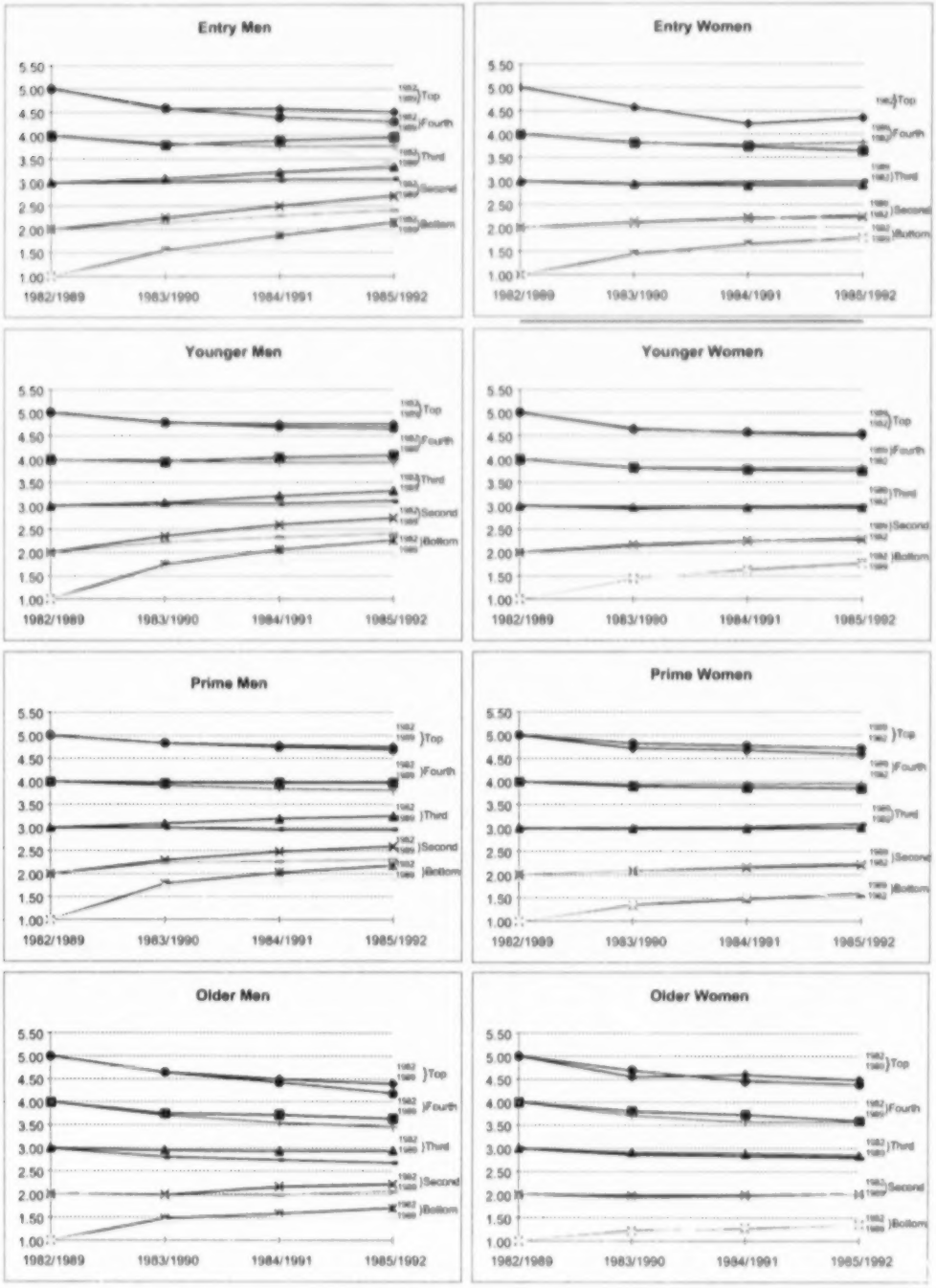
Table 4b: Quintile Changes Using the Summary Quintile Index, All Earners, All Years

Quintile	Quintile Index in Subsequent Year										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1982											
Top	5.00	4.77	4.72	4.69	4.67	4.64	4.62	4.60	4.58	4.53	4.49
Fourth	4.00	3.89	3.91	3.92	3.93	3.93	3.92	3.91	3.89	3.88	3.90
Third	3.00	3.01	3.06	3.11	3.15	3.18	3.19	3.21	3.23	3.22	3.24
Second	2.00	2.16	2.30	2.38	2.47	2.54	2.58	2.63	2.66	2.70	2.76
Bottom	1.00	1.48	1.69	1.86	1.99	2.10	2.19	2.26	2.33	2.39	2.44
1983											
Top	4.79	5.00	4.81	4.76	4.72	4.68	4.65	4.63	4.60	4.55	4.52
Fourth	3.81	4.00	3.92	3.91	3.92	3.92	3.90	3.89	3.88	3.87	3.89
Third	2.85	3.00	3.00	3.04	3.09	3.13	3.13	3.15	3.17	3.17	3.19
Second	2.01	2.00	2.16	2.27	2.37	2.46	2.51	2.56	2.61	2.64	2.69
Bottom	1.49	1.00	1.49	1.73	1.88	2.03	2.15	2.24	2.31	2.37	2.44
1984											
Top	4.69	4.80	5.00	4.83	4.77	4.72	4.68	4.65	4.61	4.57	4.54
Fourth	3.68	3.80	4.00	3.92	3.92	3.92	3.90	3.88	3.88	3.86	3.87
Third	2.76	2.84	3.00	3.00	3.05	3.08	3.10	3.13	3.15	3.15	3.18
Second	2.03	2.00	2.00	2.16	2.28	2.39	2.46	2.52	2.57	2.60	2.64
Bottom	1.62	1.45	1.00	1.48	1.70	1.87	2.01	2.12	2.21	2.29	2.36
1985											
Top	4.59	4.69	4.80	5.00	4.82	4.76	4.72	4.68	4.64	4.58	4.55
Fourth	3.59	3.68	3.81	4.00	3.92	3.91	3.90	3.88	3.87	3.85	3.85
Third	2.70	2.74	2.83	3.00	3.00	3.05	3.07	3.10	3.13	3.13	3.16
Second	2.05	2.02	1.98	2.00	2.16	2.27	2.36	2.43	2.49	2.53	2.59
Bottom	1.72	1.61	1.43	1.00	1.46	1.69	1.85	1.97	2.08	2.15	2.24
1986											
Top	4.52	4.61	4.70	4.82	5.00	4.82	4.76	4.71	4.66	4.60	4.57
Fourth	3.51	3.59	3.69	3.82	4.00	3.92	3.90	3.88	3.87	3.85	3.84
Third	2.65	2.68	2.73	2.83	3.00	3.00	3.03	3.05	3.08	3.09	3.11
Second	2.06	2.03	2.00	1.97	2.00	2.15	2.25	2.34	2.41	2.47	2.53
Bottom	1.81	1.71	1.59	1.43	1.00	1.48	1.70	1.84	1.97	2.06	2.15
1987											
Top	4.44	4.52	4.61	4.71	4.80	5.00	4.81	4.75	4.68	4.61	4.58
Fourth	3.45	3.50	3.59	3.70	3.82	4.00	3.90	3.87	3.86	3.83	3.83
Third	2.61	2.64	2.68	2.74	2.83	3.00	2.99	3.01	3.05	3.07	3.09
Second	2.10	2.06	2.02	2.00	1.98	2.00	2.14	2.25	2.33	2.38	2.45
Bottom	1.87	1.81	1.71	1.59	1.43	1.00	1.46	1.67	1.82	1.92	2.01
1988											
Top	4.37	4.44	4.53	4.62	4.70	4.80	5.00	4.81	4.72	4.65	4.60
Fourth	3.40	3.44	3.50	3.60	3.70	3.82	4.00	3.89	3.87	3.84	3.84
Third	2.61	2.63	2.66	2.70	2.76	2.86	3.00	2.98	3.01	3.03	3.06
Second	2.12	2.09	2.06	2.04	2.03	2.01	2.00	2.14	2.23	2.29	2.37
Bottom	1.91	1.88	1.79	1.69	1.60	1.42	1.00	1.46	1.64	1.77	1.88
1989											
Top	4.33	4.38	4.46	4.55	4.63	4.71	4.81	5.00	4.79	4.70	4.64
Fourth	3.36	3.39	3.44	3.53	3.61	3.71	3.83	4.00	3.89	3.85	3.84
Third	2.62	2.63	2.64	2.68	2.72	2.79	2.87	3.00	2.98	2.99	3.02
Second	2.15	2.14	2.11	2.07	2.07	2.04	2.01	2.00	2.12	2.21	2.29
Bottom	1.96	1.93	1.85	1.79	1.71	1.61	1.44	1.00	1.45	1.62	1.75
1990											
Top	4.28	4.33	4.39	4.49	4.55	4.64	4.72	4.81	5.00	4.78	4.71
Fourth	3.33	3.35	3.40	3.46	3.54	3.62	3.72	3.84	4.00	3.87	3.84
Third	2.59	2.61	2.63	2.66	2.69	2.74	2.80	2.86	3.00	2.96	2.99
Second	2.18	2.17	2.14	2.12	2.10	2.09	2.07	2.03	2.00	2.10	2.20
Bottom	2.02	1.99	1.94	1.86	1.81	1.73	1.62	1.45	1.00	1.43	1.59
1991											
Top	4.25	4.29	4.35	4.44	4.50	4.58	4.66	4.73	4.82	5.00	4.80
Fourth	3.29	3.30	3.35	3.41	3.48	3.55	3.64	3.73	3.85	4.00	3.88
Third	2.60	2.62	2.63	2.65	2.68	2.72	2.76	2.81	2.89	3.00	2.96
Second	2.24	2.24	2.21	2.20	2.18	2.16	2.14	2.10	2.06	2.00	2.12
Bottom	2.08	2.06	2.01	1.94	1.91	1.85	1.77	1.67	1.49	1.00	1.44
1992											
Top	4.20	4.24	4.31	4.38	4.44	4.53	4.60	4.67	4.75	4.83	5.00
Fourth	3.26	3.28	3.31	3.37	3.42	3.49	3.57	3.65	3.74	3.83	4.00
Third	2.58	2.59	2.61	2.63	2.66	2.69	2.73	2.76	2.82	2.87	3.00
Second	2.26	2.27	2.25	2.23	2.22	2.20	2.18	2.15	2.11	2.05	2.00
Bottom	2.13	2.10	2.07	2.01	1.98	1.93	1.87	1.81	1.67	1.48	1.00

Table 4c: Quintile Changes Using the Summary Quintile Index, 1989 Base Year

Quintile	Quintile Index in Subsequent Year										
in 1989	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
All											
Top	4.33	4.38	4.46	4.55	4.63	4.71	4.81	5.00	4.79	4.70	4.64
Fourth	3.36	3.39	3.44	3.53	3.61	3.71	3.83	4.00	3.89	3.85	3.84
Third	2.62	2.63	2.64	2.68	2.72	2.79	2.87	3.00	2.98	2.99	3.02
Second	2.15	2.14	2.11	2.07	2.07	2.04	2.01	2.00	2.12	2.21	2.29
Bottom	1.96	1.93	1.85	1.79	1.71	1.61	1.44	1.00	1.45	1.62	1.75
Entry Men											
Top	-	-	-	2.48	2.97	3.59	4.13	5.00	4.59	4.38	4.29
Fourth	-	-	-	2.08	2.38	2.77	3.34	4.00	3.83	3.77	3.78
Third	-	-	-	1.80	1.93	2.25	2.52	3.00	3.01	3.05	3.07
Second	-	-	-	1.51	1.60	1.69	1.76	2.00	2.14	2.29	2.40
Bottom	-	-	-	1.49	1.41	1.40	1.28	1.00	1.48	1.70	1.89
Younger Men											
Top	3.59	3.72	3.93	4.17	4.33	4.50	4.71	5.00	4.79	4.70	4.66
Fourth	2.85	2.91	3.01	3.23	3.41	3.58	3.78	4.00	3.96	3.93	3.93
Third	2.27	2.25	2.33	2.49	2.59	2.70	2.84	3.00	3.06	3.06	3.10
Second	1.98	1.89	1.89	1.95	2.04	2.08	2.07	2.00	2.23	2.33	2.40
Bottom	1.77	1.73	1.66	1.67	1.68	1.71	1.60	1.00	1.64	1.81	1.94
Prime Men											
Top	4.57	4.60	4.66	4.73	4.77	4.82	4.87	5.00	4.83	4.75	4.69
Fourth	3.70	3.74	3.79	3.86	3.89	3.91	3.95	4.00	3.91	3.84	3.81
Third	3.03	3.02	3.04	3.05	3.04	3.07	3.06	3.00	3.00	2.98	2.96
Second	2.65	2.62	2.60	2.53	2.49	2.42	2.28	2.00	2.24	2.27	2.31
Bottom	2.45	2.43	2.36	2.26	2.17	2.10	1.81	1.00	1.72	1.83	1.90
Older Men											
Top	4.72	4.74	4.78	4.81	4.83	4.84	4.88	5.00	4.64	4.42	4.18
Fourth	3.95	3.95	3.99	4.03	4.05	4.03	4.06	4.00	3.71	3.55	3.45
Third	3.35	3.33	3.28	3.27	3.30	3.28	3.25	3.00	2.80	2.74	2.68
Second	3.15	3.05	2.99	2.88	2.78	2.69	2.46	2.00	1.97	1.98	2.06
Bottom	3.19	3.09	3.00	2.80	2.68	2.37	2.01	1.00	1.39	1.48	1.48
Entry Women											
Top	-	-	-	-	-	-	-	-	-	-	-
Fourth	-	-	-	1.56	2.04	2.57	3.25	4.00	3.80	3.77	3.82
Third	-	-	-	1.67	1.92	2.22	2.52	3.00	2.94	2.97	3.00
Second	-	-	-	1.43	1.53	1.62	1.75	2.00	2.09	2.18	2.28
Bottom	-	-	-	1.29	1.34	1.31	1.24	1.00	1.37	1.59	1.77
Younger Women											
Top	3.21	3.41	3.58	3.90	4.09	4.32	4.60	5.00	4.64	4.58	4.54
Fourth	2.77	2.84	2.91	3.08	3.28	3.48	3.65	4.00	3.83	3.80	3.82
Third	2.30	2.35	2.37	2.46	2.58	2.68	2.79	3.00	2.93	2.98	3.00
Second	1.94	1.96	1.93	1.93	1.98	1.99	1.98	2.00	2.12	2.22	2.32
Bottom	1.78	1.77	1.70	1.68	1.65	1.56	1.43	1.00	1.45	1.61	1.74
Prime Women											
Top	4.08	4.20	4.30	4.40	4.53	4.66	4.79	5.00	4.82	4.76	4.71
Fourth	3.30	3.36	3.44	3.51	3.60	3.71	3.82	4.00	3.94	3.94	3.95
Third	2.52	2.60	2.62	2.69	2.75	2.81	2.87	3.00	3.01	3.02	3.06
Second	1.94	1.98	1.97	1.96	1.97	1.96	1.96	2.00	2.08	2.17	2.25
Bottom	1.66	1.67	1.61	1.58	1.51	1.42	1.29	1.00	1.37	1.53	1.65
Older Women											
Top	4.33	4.41	4.52	4.55	4.68	4.75	4.82	5.00	4.69	4.45	4.38
Fourth	3.62	3.67	3.70	3.76	3.84	3.88	3.93	4.00	3.71	3.57	3.57
Third	2.82	2.88	2.88	2.91	2.96	2.97	2.95	3.00	2.86	2.83	2.79
Second	2.17	2.17	2.16	2.16	2.17	2.13	2.10	2.00	1.93	1.96	2.00
Bottom	1.89	1.88	1.84	1.77	1.70	1.57	1.39	1.00	1.20	1.29	1.35

Figure 4b: Three-Year Quintile Changes Using the Summary Index, 1982-1985 and 1989-1992



Source : Tables 4a, 4c

base years. That is, there was less upward movement from the lower quintiles *and* less stability at the top for those starting at higher earnings levels – an important finding, with significant implications for the *future* earnings levels of this group. That is, not only were Entry Men's mean earnings *levels* lower in recent years, but so too were their rates of earnings *growth*.

For Younger Men, there were also declines, but not in all cases and the declines were not nearly as great as for the Entry group. A similar pattern holds for Prime and Older Men. Interestingly, the declines in the index scores across the two periods for these older groups (*i.e.*, all but the Entry Men) are greater for those who start at the lower quintile levels than for those starting at the top. This would indicate relatively greater deterioration in the opportunities for moving up through the earnings distribution than in keeping one's place if already at a higher earnings level.

Thus, the overall story for men is decidedly less earnings growth over time for those starting at the bottom, somewhat less stability at the top, and the Entry group being hit the hardest by far in both these respects.

A very different story emerges for women. First, Entry Women had more-or-less the same index scores in the earlier and later periods (again, comparing 1990 with 1983, 1991 with 1984, and 1992 with 1985 – corresponding to the 1982 and 1989 base years). Young Women did about the same in the first year as in the earlier period, and then a bit better as we move forward from the base years, while Prime Women had higher index scores across the quintile spectrum in all years. Older Women had mixed results.

Hence, the earnings record in terms of upward mobility and stability at the top had generally improved for women in the early 1990's – relative to the early/mid-1980's, and also relative to men's earnings dynamics in this respect. The gains were, however, greatest for Prime and Younger Women, with Entry Women doing only a little better than just holding their own – again, the advantages accruing to their gender being largely offset by the emerging disadvantages accruing to them as youthful workers.

These changes in earnings dynamics over the period left some interesting gender patterns by the early-1990s. Looking at the results using 1989 as the base year, Entry Women starting in the lower quintiles were, on average, almost as likely to move up the earnings distribution in subsequent years as were Entry Men. Moreover, women starting near the top were especially close to men in terms of maintaining their earnings levels over time (actually demonstrating *greater* stability at the top than men in one case). Both these results are quite different from what held in the earlier period, and a similar pattern of change holds for Younger Men and Women. For the Prime groups, Women starting in the upper three quintiles actually had *higher* earnings (quintile) levels on average – indicating greater earnings stability – than Prime Men initially in similar situations. However, the relative gains made by those women starting at lower quintile levels were not quite sufficient to completely overcome men's advantage in terms of moving up the earnings ladder. Again, these are significant changes from the situation that held in the early/mid-1980s.

5. Conclusion

The major findings of this analysis may be summarized as follows. First, a general profile of the correlation of individuals' earnings over time has been constructed for all earners, for all men and women, and for the eight sex-age groups treated in this study. It was found that over the 1982-92 period studied, there was generally a considerable correlation of earnings from one year to another, with decreasing marginal mobility over longer periods of time. Comparisons of the patterns by sex and age were made, and the results placed in an international context. Importantly, no general shifts in correlation patterns between the earlier years and the later ones were identified.

Second, an analysis based on individuals' place in the overall earnings distribution revealed a somewhat different set of findings. Although the conventional average quintile jump measures generated similar results to the correlation coefficients, the use of the average quintile index showed several interesting patterns with respect to "trend mobility" – thus abstracting from the "churning mobility" around given means, a decomposition not possible with the correlation coefficients or average jump measures.

In particular, using the mean quintile index we found a general pattern of considerable upward earnings mobility from lower earnings quintiles to higher ones over time, and relative stability at the top, with the extent of these general tendencies varying by age and sex. Perhaps most importantly, in contrast to the relatively stationary situation over time suggested by the correlation coefficients, there appears to have been less upward earnings mobility in the more recent years covered by the analysis, while the stability at the top remained steady. Looking at these patterns in more detail revealed some cross-cutting patterns by age and sex, with a general deterioration in the mobility patterns – less upward mobility and reduced stability at the top – for men and younger workers relative to women and older workers. Again, this gives quite a different view of what has been happening to earnings mobility than what is suggested by the correlation coefficients.

The most important policy implications are probably derived from the last set of findings. The shifts in the "trend mobility" patterns, in particular, suggest important structural changes in labour markets whereby women seem likely to continue to catch up to men. Furthermore, the deteriorating situation for youth would appear to indicate a "life long" shift downward in the earnings profiles of the younger workers included in this analysis. That is, the lower levels they have been observed to have in any given year appear to be matched by lower rates of earnings increases over time, especially in the case of men. Further research on mobility patterns and recent shifts in the basic patterns would seem warranted in order to paint a fuller picture of these dynamics.

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